

ERI ANNOUNCEMENTS & COMING EVENTS

Poster/Gallery Session *Best Student Presentation Award* Winners

Outstanding graduate student and postdoctoral trainee poster presentations were recognized with awards at the September 28th *Vision Science & Visual Art Poster/Gallery Session*, at which 50 posters were displayed by ERI members and students. Award recipients were as follows:

Best Student Contribution, Vision Science & Visual Art to **Brandon Smith**, Computer Sciences (**Li Zhang**, advisor); poster title: *Light Field Video Stabilization*; poster authors: Brandon Smith, Li Zhang, Halin Jin, Aseem Agarwala.

Honorable Mention to **Ryan Liegel**, Cell Biology, Neurobiology & Anatomy at the Medical College of Wisconsin (**D.J. Sidjanin**, advisor); poster title: *Blind Sterile Locus 2 (bs2) Is a Hypomorphic Mutation in Agps*; poster authors: R. Liegel, B. Chang, D.J. Sidjanin.

Honorable Mention to **Joel Shires**, Physiology (**Michele Basso**, advisor); poster title: *Basal Ganglia Play a Key Role in Spatial Memory for Eye Movements*; poster authors: Safraaz Mahamed, Joel A. Shires, Michele A. Basso.

We gratefully acknowledge award support from these sponsors: Nikon Instruments, Inc. for donation of a Nikon Coolpix camera; UW General Library System (private gift funds held at UW Foundation) for distinctive vision-related books; and the University Book Store-Health Sciences Learning Center for UBS gift certificates.

ERI Seminar Noon to 1:00pm, November 9

Arthur Polans, PhD and **Michael Ip, MD**, both from Ophthalmology & Visual Sciences, will recount challenges of moving bench science to pre-clinical and clinical trials and of conducting trials.

“Pre-clinical to clinical: the heights and depths of translational studies”

Bock Labs Penthouse, 9th floor

RSVP for pizza lunch by 3:00pm Monday, November 8: gmstirr@wisc.edu

*Full 2010-11 ERI Seminar Schedule: <http://www.vision.wisc.edu/seminars.html>

ERI Seminar Noon to 1:00pm, December 14

Vanessa Simmering, PhD (Psychology) and **Bilge Mutlu, PhD** (Computer Sciences) will speak about

“Social and cognitive factors affecting vision choices”

Wisconsin Institutes of Medical Research (WIMR) Room 7001A

RSVP for pizza lunch by 3:00pm on Monday, December 13: gmstirr@wisc.edu

Vision Roundtables Open

Four ERI-member roundtable discussions are planned for 2010-11. They will be scheduled in coming months based on member interest in the following topics, developed with feedback from past roundtable participants: 1) eye tracking studies; 2) mouse/rat phenotyping and facilities; 3) informatics and computational tools; and 4) visual communication: science-art interface. Intended to bring members together around themes that link research interests and methods, these 60- to 90-minute discussions provide opportunities to meet fellow members, discern common interests and varied perspectives, and consider potential interactions or collaborative possibilities. Contact Gail Stirr (gmstirr@wisc.edu) if you are interested in being part of one of these conversations.

FACULTY, STAFF & AFFILIATE ACCOMPLISHMENTS

Distinguished Dissertation Advances to National Competition

Vanessa Simmering (Psychology) has received the 2010 University of Iowa DC Priestersbach Dissertation Prize for Social Sciences, recognizing excellence in doctoral research. Every two years each social sciences department can nominate one student who completed PhD requirements within the previous two years. Simmering’s dissertation, titled “Developing a magic number: the dynamic field theory explains why visual working memory capacity estimates differ across tasks and development,” was chosen as the best, representing highly original work that makes an unusually significant contribution to her field. As award recipient, Simmering was honored with a \$2500 cash prize and becomes the University of Iowa’s nominee for the Council of Graduate Schools/University Microfilms International Distinguished Dissertation Award.

Foundation Fighting Blindness Honors Retinal Research

David Gamm, MD, PhD (Ophthalmology & Visual Sciences) received the Foundation Fighting Blindness Board of Directors Award for Retinal Degenerative Disease Research, 2010. Given annually to scientists for their extraordinary efforts in the advancement of treatments and cures, this award recognized Gamm for demonstrating the potential for stem cells to save and restore vision and for the evident promise in development of stem cell treatments.

RESEARCH NEWS

Imaging Technology Traces Cell Fusion

Kevin Eliceiri, director of the Laboratory for Optical and Computational Instrumentation (LOCI), is interested in developing optical and computational approaches to studying living cellular processes non-invasively and in bringing these technologies to vision studies. In a study published in the journal *Biology of the Cell*, Eliceiri and colleagues introduce a biomolecular fluorescence system for detecting and tracking live cell fusion products. Cell fusion, postulated to contribute to tissue maintenance and carcinogenesis, has been hard to characterize due to the dynamic nature of the process and inadequate means to trace fusion products over time. By following the interactions of proteins joined to fragments of a fluorescent protein during cell fusion, Eliceiri's group was able to identify and track fusion products. Their observations "support the possibility that chromosomal instability characteristic of tumor cells may be incurred as a consequence of cell fusion and suggest the role of cell fusion in carcinogenesis may have been masked to this point for lack of an inducible method to track it." [Lin HP, Vincenz C, Eliceiri KW, Kerppola TK, Ogle BM. Biomolecular fluorescence complementation analysis of eukaryotic fusion products *Biol Cell*. 2010 Aug 6;102(9):525-37.]

NSF Grant Will Advance Role of Machine Vision in Plant Phenotyping

Mechanical Engineering Professor **Nicola Ferrier**, UW Botany Professor Edgar Spalding, and collaborators at Doane College and the University of Florida have received a \$4 million, four-year grant from the National Science Foundation, "Advancing Complex Phenotype Analyses through Machine Vision and Computation." The team will integrate engineering, computer sciences, and biology methodologies to detect and quantify plant phenotypes—observable biological differences stemming from gene mutations. Successful large-scale phenotyping requires automated data acquisition and computation. This project will build on previous Ferrier & Spalding NSF-funded research utilizing robot systems and machine vision to increase the precision, degree of automation, and throughput of measurements, thereby increasing the amount and quality of phenotype information that can be extracted from expansive collections of mutants and populations of naturally occurring genetic variants. Development of such specialized tools will impact many researchers in plant functional genomics, and will have wide-ranging machine vision applications in numerous fields.

Mouse Model Facilitates Gene Identification in Parallel Human Disease

Results from work supported by an ERI Rapid Response Initiative grant to **Christopher Bradfield** (Oncology) and collaborators **Anna Shen** (Oncology), **Dick Dubielzig** (Pathobiological Sciences, VetMed), and **Christopher Murphy** (Surgical & Radiological Sciences, VetMed, UC-Davis) were published in the online Public Library of Science journal *PLoS ONE*. Titled "The PPCD1 Mouse: characterization of a mouse model for posterior polymorphous corneal dystrophy and identification of a candidate gene," the paper describes a spontaneous mouse mutant that carries a corneal abnormality exhibiting the characteristics of inherited human posterior polymorphous corneal dystrophy (PPCD). Bradfield and Shen have characterized the causative mutation, located in the mouse equivalent of the human PPCD1 locus, and have identified a gene they believe to be responsible. This information will be useful in identifying the corresponding human gene and in elucidating the mechanisms leading to corneal endothelial dysfunction.

DOD Funds BrainPort® Vision Device Research with Blinded Veterans

Aimee Arnoldussen, research scientist at Wicab, Inc., is lead PI on a three-year, \$3.2 million Department of Defense Medical Research and Development Program grant with co-PIs at the University of Pittsburgh Medical School and Carnegie Mellon. The project, "Visual Information Restoration and Rehabilitation via Sensory Substitution Technology," will employ Wicab's BrainPort vision device in clinical testing with blinded veterans, with goals of restoring visual information to enable activities of daily living, to enhance quality of life, and to increase rehabilitation from blinding injuries sustained in recent military conflicts. This visual prosthetic enables perception of visual information using the tongue and camera system as a paired substitute for the eye. Arnoldussen views the device as an emerging therapeutic tool which can advance personal independence and interactions with the environment, radically altering the way rehabilitation is provided.

Voltage Imaging Lends Insight into Neural Circuits Underlying Behavior

An ERI Rapid Response Initiative grant to **Michele Basso** (Physiology) supported the work described in a recent *Journal of Neuroscience* article co-authored with grant collaborators Corinne Vokoun and Meyer Jackson (Physiology). The article, entitled "Intralaminar and interlaminar activity within the rodent superior colliculus visualized with voltage imaging," recounts use of an *in vitro* slice preparation to provide novel insights into the dynamics of neural population activity. Using a sophisticated voltage imaging technique with high spatial and temporal resolution, the investigators mapped coordinated neural activity throughout the superior

colliculus (a midbrain structure involved in the control of eye movements) following local stimulation of visual inputs that might mimic sensory stimuli. A wide range of activity was observed throughout the superior colliculus. These exciting results provide novel insights into the population activity which underlies visually-guided eye movements, and therefore serve as a strong complement to *in vivo* studies that explore electrophysiological signals in behaving animals.

NSF Supports Human-Centered “Agent” Development

Bilge Mutlu and **Michael Gleicher** (Computer Sciences) are co-PIs on a three-year National Science Foundation *Human-Centered Computing* grant, “Designing Effective Gaze Mechanisms for Cross-Modal Embodied Agents.” With funding of \$585,000, they will combine their expertise to construct agents (such as robots, life-sized virtual humans, or animated avatars) that can achieve high-level social and communicative goals. By studying human gaze behaviors like the non-verbal social cues we use to communicate our comprehension, to control the flow of conversation, and to indicate interest in or appraisal of objects or ideas, they hope to create robots or other agents to use visual cues just as effectively as humans do. Mutlu and Gleicher feel that such “embodied agents” promise significant social, cognitive, and organizational benefits through applications in real-world tasks within education, training, rehabilitation, and collaborative work.

With NIH Help: New Understanding Behind Diabetic Retinopathy

Nader Sheibani (Ophthalmology & Visual Sciences) and **Amir Assadi** (Mathematics), along with collaborators **Daniel Albert** (Ophthalmology & Visual Sciences) and **Christine Sorenson** (Pediatrics), are ERI members teaming up with Madison colleague Fariba Assadi-Porter in Biochemistry, with Hao Zhang at UW-Milwaukee, and with Shuliang Jiao at the University of Southern California. Together they will work to detect and determine biochemical and gene-specific changes in the development and progression of retinopathies during diabetes. The project – titled “Integrated Multidisciplinary Strategies for Detection of Diabetic Retinopathies” – is supported by a three-year, \$3.9 million grant from the National Institutes of Health. The research groups will use an integrated strategy to develop early, non-invasive methods to detect and identify the molecular and cellular basis of diabetic retinopathy, with particular attention to factors such as thrombospondin-1 and vascular endothelial growth factor. While these factors play essential roles in normal retinal vascular function, their alteration during diabetes may contribute to abnormal vascular function and to growth of new blood vessels that speed vision loss. Better and more effective therapies are the desired project outcomes.

NEW PUBLICATIONS/CURRENT LITERATURE

These are among recent publications by ERI members, including Epubs and print publications from mid August to early October 2010. The list is organized alphabetically by first-listed ERI author name, highlighted in bold. As we do not have full access to all publication resources for each discipline, we may have missed one of your publications. If so, please accept our apologies and send us your citations for inclusion in the next issue.

Shires J, Joshi S, **Basso MA**. Shedding new light on the role of the basal ganglia-superior colliculus pathway in eye movements. *Curr Opin Neurobiol*. 2010 Sep 7. [Epub ahead of print]

Vokoun CR, Jackson MB, **Basso MA**. Intralaminar and interlaminar activity within the rodent superior colliculus visualized with voltage imaging. *J Neurosci*. 2010 Aug 11;30(32):10667-82.

Blodi BA, Domalpally A, Scott IU, **Ip MS**, Oden NL, Elledge J, Warren K, Altaweel MM, Kim JE, Van Veldhuisen PC; SCORE Study Research Group. Standard care vs corticosteroid for retinal vein occlusion (SCORE) study system for evaluation of stereoscopic color fundus photographs and fluorescein angiograms: SCORE study report 9. *Arch Ophthalmol*. 2010 Sep;128(9):1140-5.

Ritter M, Elledge J, Simader C, Deak GG, Benesch T, **Blodi BA**, Schmidt-Erfurth UM. Evaluation of optical coherence tomography findings in age-related macular degeneration: a reproducibility study of two independent reading centres. *Br J Ophthalmol*. 2010 Aug 30. [Epub ahead of print]

Sadda SR, Stoller G, Boyer DS, **Blodi BA**, Shapiro H, Ianchulev T. Anatomical benefit from ranibizumab treatment of predominantly classic neovascular age-related macular degeneration in the 2-year anchor study. *Retina*. 2010 Oct;30(9):1390-9.

Nukaya M, Lin BC, Glover E, Moran SM, Kennedy GD, **Bradfield CA**. The aryl hydrocarbon receptor-interacting protein (AIP) is required for dioxin-induced hepatotoxicity, but not for the induction of the CYP1A1 and CYP1A2 genes. *J Biol Chem*. 2010 Sep 9. [Epub ahead of print]

Mezrich JD, Fechner JH, Zhang X, Johnson BP, Burlingham WJ, **Bradfield CA**. An interaction between kynurenine and the aryl hydrocarbon receptor can generate regulatory T cells. *J Immunol*. 2010 Sep 15;185(6):3190-8. Epub 2010 Aug 18.

Danis RP, Scott IU, Qin H, Altaweel MM, Bressler NM, Bressler SB, Browning DJ, Kollman C; for the Diabetic Retinopathy Clinical Research Network. Association of fluorescein angiographic features with visual acuity and with optical coherence tomographic and stereoscopic color fundus photographic features of diabetic macular edema in a randomized clinical trial. *Retina*. 2010 Aug 12. [Epub ahead of print]

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Chu UB, Song J, Mavlyutov TA, **Guo LW**. In vitro interaction of tubulin with the photoreceptor cGMP phosphodiesterase gamma-subunit. *Neurosci Lett*. 2010 Oct 4;482(3):225-9. Epub 2010 Jul 22.

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Recchia FM, Scott IU, Brown GC, Brown MM, Ho AC, **Ip MS**. Small-gauge pars plana vitrectomy: a report by the American Academy of Ophthalmology. *Ophthalmology*. 2010 Sep;117(9):1851-7.

Johnson BA, Cole BS, Geisert EE, **Ikeda S, Ikeda A**. Tyrosinase is the modifier of retinoschisis in mice. *Genetics*. 2010 Sep 27. [Epub ahead of print]

Verdoni AM, Schuster KJ, Cole BS, **Ikeda A**, Kao WW, **Ikeda S**. A pathogenic relationship between a regulator of the actin cytoskeleton and serum response factor. *Genetics*. 2010 Sep;186(1):147-57. Epub 2010 Jul 6.

Ly T, Gupta N, Weinreb RN, **Kaufman PL**, Yüdel YH. Dendrite plasticity in the lateral geniculate nucleus in primate glaucoma. *Vision Res*. 2010 Aug 6. [Epub ahead of print]

Wang Y, Dunn AK, Wilneff J, **McFall-Ngai MJ**, Spiro S, Ruby EG. *Vibrio fischeri* flavohemoglobin protects against nitric oxide during initiation of the squid-*Vibrio* symbiosis. *Mol Microbiol*. 2010 Sep 2. [Epub ahead of print]

Smith LN, **Miller PE**, Felchle LM. Effects of topical administration of latanoprost, timolol, or a combination of latanoprost and timolol on intraocular pressure, pupil size, and heart rate in clinically normal dogs. *Am J Vet Res*. 2010 Sep;71(9):1055-61.

Gasiorowski JZ, Liliensiek SJ, Russell P, Stephan DA, **Nealey PF, Murphy CJ**. Alterations in gene expression of human vascular endothelial cells associated with nanotopographic cues. *Biomaterials*. 2010 Sep 15. [Epub ahead of print]

Lichtlen P, Lam TT, **Nork TM**, Streit T, Urech DM. Relative contribution of VEGF and TNF-alpha in the cynomolgus laser-induced CNV model: comparing the efficacy of bevacizumab, adalimumab, and ESBA105. *Invest Ophthalmol Vis Sci*. 2010 Sep;51(9):4738-45. Epub 2010 Apr 14.

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Rajala AZ, Reininger KR, Lancaster KM, **Populin LC**. Rhesus monkeys (*Macaca mulatta*) do recognize themselves in the mirror: implications for the evolution of self-recognition. *PLoS ONE*. 2010 Sep 29;5(9):e12865.

Su TP, Hayashi T, Maurice T, Buch S, **Ruoho AE**. The sigma-1 receptor chaperone as an inter-organelle signaling modulator. *Trends Pharmacol Sci*. 2010 Sep 23. [Epub ahead of print]

Ho SS, **Scheufele DA**, Corley EA. Making sense of policy choices: understanding the roles of value predispositions, mass media, and cognitive processing in public attitudes toward nanotechnology. *J. Nanopart Res*, online publication August 1, 2010.

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Shen AL, O'Leary KA, **Dubielzig RR**, Drinkwater N, **Murphy CJ**, Kasper CB, **Bradfield CA**. The PPCD1 mouse; characterization of a mouse model for posterior polymorphous corneal dystrophy and identification of a candidate gene. *PLoS One*. 2010 Aug 16;5(8). pii: e12213.

Park S, Dimaio TA, Scheef EA, **Sorenson CM, Sheibani N**. PECAM-1 regulates the proangiogenic properties of endothelial cells through modulation of cell-cell and cell-matrix interactions. *Am J Physiol Cell Physiol*. 2010 Sep 1. [Epub ahead of print]

Smith PH, Manning KA, **Uhlrich DJ**. Evaluation of inputs to rat primary auditory cortex from the supragenulate nucleus and extrastriate visual cortex. *J Comp Neurol*. 2010 Sep 15;518(18):3679-700.

**We invite your feedback on this newsletter for the ERI membership.
Please respond with comments at: [Insights Feedback](#)**

About ERI *InSights*

The UW Eye Research Institute will distribute *InSights* every other month. Its purpose is to build ERI community, advancing member connections and collaborations by sharing research and educational activities as well as member accomplishments and honors (including those of their lab associates and students). We welcome news of research advances, scholarly publications, grant awards, educational and professional honors, available lab positions, or shared equipment/services. If you have an item you wish to submit for possible inclusion, please send it to Gail Stirr at gmstirr@wisc.edu

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